

NATURAL HISTORY OF THE SOUTH INDIAN GERBILLE
TATERA INDICA CUVIERI (WATERHOUSE)

BY

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INTRODUCTION

Among the many problems confronting the agriculturist is one which concerns the large-scale destruction of food crops by pests. While efforts are being made to assess the damage and suggest measures for biological control of a number of insect pests, nearly the same amount of attention has not been paid to the damage caused by the rodents, of which the gerbilles are of considerable importance. For instance, the Mysore Agricultural Calendar for 1949-50, dealing with Rodent crop pests, makes no mention of the common gerbilles, though in one of the earliest records, Blanford (1891) stated that 'these rats feed upon roots and grass, especially harayali (*Cynodon dactylon*), seeds and grain, and sometimes caused great damage to the crops. In 1878-79 they ravaged the grain fields in the Deccan throughout several thousand square miles cutting down jawari (*Holcus sorghum*) and bajri (*H. spicatus*) stalks and feeding on the grain, part of which they stored in their burrows'. Fletcher (1914) while recognising the damage caused by these gerbilles remarked 'normally it probably does some good because its favourite food is the roots of the harayali grass (*Cynodon dactylon*) which is a most pestilential weed as a rule . . . '.

Besides, our knowledge of the reproduction of a number of rodents, especially of the tropical species is very scanty. Drawing attention to this point Mossman and Judas (1949) remark 'In Rodents we have extensive information on a few species of the family Muridae, on one species of the Cavidae, on one of the Sciuridae and one of the Geomyidae and a little, mostly morphological, on a few members of the same families. This means that of the 32 living families of Rodents, we have a workable knowledge of only 5. Among the unknown 27, mammalogists have known for a long time that there are far greater diversities of reproductive pattern than among the other 5. How much are we justified in generalising about reproduction in Rodents?'

It was thought that a study of the reproductive phenomena of a member of the subfamily: Gerbillinae, family: Muridae, about which very little is known at present, would, besides filling the lacunae in our knowledge about this group of rodents, be of some economic value. The present study deals with the natural history of the Common South Indian Gerbille *Tatera indica cuvieri* (Waterhouse). The present report is based on extensive field observations and examination

of trapped animals brought to the laboratory. A number of burrow systems were dug out completely and their occupants were captured by net. The data pertain to the area around Shivanahalli village, Bangalore District, Mysore State, South India, about three miles from the city limits of Bangalore. The collection extended over a period of over a year from August 1952 to December 1953. The observations recorded here may not be typical for this species in other parts of South India, as different regions exhibit marked differences in climatic conditions.

ENVIRONMENT

Bangalore lies in the middle of the Deccan plateau at a height of about 3,050 ft. above mean sea level. The city area is surrounded on all sides by cultivated fields which yield a variety of crops through the greater part of the year. The natural vegetation around Bangalore is of the dry deciduous category, where there are very few trees apart from those forming the avenues along the highways. This is on account of the scanty rainfall (average rainfall: 34.5 in. per year) and interference by man. Owing to the comparatively dry climatic conditions and the soil being exposed to the hot sun for the greater part of the year, the trees are stunted and seldom attain great dimensions. Before the monsoon the vegetation becomes active and green. *Cassia auriculata* is one of the most widespread and abundant shrubby species found in the open and as undergrowth in many of the slightly wooded areas. Dense impenetrable thickets of *Lantana camara* var. *aculeata* cover large tracts of land. The common shrubby species occurring in and around the fields are: *Acacia leucocephala*, *Acacia arabica*, *Calotropis gigantea*, species of *Capparis*, *Anisomeles*, *Gymnosporia*, *Flacourtia*, *Streblus*, *Fluggea*, *Dodonea*, *Grewia*, *Canthium*, *Sopubia*, *Lepidogathis* and *Teucrium*. The entire area is covered with a variety of grasses, namely: *Cynodon dactylon*, *Brachiaria distachya*, *Urochloa reptans*, *Setaria intermedia*, *Sporobolus* sp., and *Eragrostis bifaria*, by the first week of August.

Of the crops supported mainly by the monsoon rains is Ragi (*Eleusine coracana*), the most important food crop of the area, which is grown under dry cultivation. Sowing is done by the middle of June or the beginning of July and the crops harvested in December. A mixed crop of legumes and cereals is grown with ragi to avoid a regular rotation of crops. A few of the more important mixed crops are: Jola: *Andropogon sorghum*, Red gram: *Cajanus indicus*, Avare: *Dolichos lablab*, Horse gram: *Dolichos biflorus*, Black gram: *Phaseolus mungo*, Bengal gram: *Cicer arietinum*, Cow peas: *Vigna catieng*, Sesame: *Sesamum indicum*, Castor: *Ricinus communis* and Ground nuts: *Arachis hypogea*, which are harvested completely by the middle of January. The fields are generally left bare for the rest of the period from February to June.

The climate of Bangalore does not present such marked contrasts in meteorological conditions as in other parts of South India. Records maintained by the meteorological department of the State for 40 years show that from January to March, clear skies, fine weather, low humidity,

and slight diurnal range of temperature (80° to 83°) are the usual features. The north-east monsoon is slightly active during this period. The hot weather period of April and May is one of continuous increase in temperature to a maximum of 95° in the middle of May. Towards the first week of May the south-west monsoon bursts over the peninsula. The strength of the wind currents and the accompanying rainfall gradually increase from June and remain steady till the end of October. August, September and October experience heavy rainfall. The second half of the wet season forms a period of transition leading to the dry winter season, which begins by the first week of December and continues to the end of January. During winter the night temperature drops considerably (70°).

HABITAT

The gerbilles are mainly nocturnal and are confined to their burrows by day. The burrows are dug in soft soil on the borders of cultivated fields. They are occasionally found in deserted ant hills. Each burrow system has two or three openings and the passages are long, winding, 3 to 4 inches in diameter and extend to a depth of 4 to 5 ft. below the surface. Near the main entrance the tunnel branches off into two or three lanes all of which, except one, end in blind alleys and are thought to be meant for misleading stragglers into the burrows. The gerbilles constantly make new entrances leading to the different portions of the winding tunnels. These entrances are seldom used till the soil thrown out during the excavation is sufficiently dry. As the animal enters, after completion of the connection with the main tunnel, it partially seals off the entrance by kicking mud with its hind feet. These new entrances are the emergency exits. The fresh earth thrown out in working these exits generally gives away the position of the burrow system, which otherwise is carefully concealed in the undergrowth. When alarmed, the gerbille, with remarkable agility, unexpectedly darts out through one of the emergency exits to the open and dashes to a nearby bush to become instantly lost to view. In the centre of the main passage or tunnel an area is widened out forming the living and breeding chamber. The animal scoops out mud from the bottom of the chamber to form a shallow trough. Tender blades of grass from the neighbourhood (*Cynodon dactylon*, etc.), are finely shredded and arranged compactly in the trough on which the litter is laid or the animal rests. Normally each burrow is the home of an adult male and an adult female with their young.

A few burrow systems, undisturbed by human intervention, harbour a large collection of gerbilles numbering seventy-five or more. In such a large grouping of animals the correct identity of the extent and delimitation of the various burrow systems becomes difficult on account of their close proximity.

The gerbilles feed on the plant foods previously listed. The plants eaten are usually green, but some are hard seeds, small stems and rhizomes of a variety of grasses. A detailed analysis of the stomach contents is being published elsewhere.

SURVIVAL

There are a number of factors affecting the survival of individuals in a wild population of rodents. The survival of a considerably large number to the age of sexual maturity and their consequent breeding is of the utmost importance for the maintenance of the species. The physical environment does not seem to affect the survival of the gerbilles to a great extent as they were taken in sufficiently large numbers in all months of the year. During the rainy season (June to October) many of the low-lying burrow systems are flooded drowning a number of their occupants.

Frequently in winter, a number of animals are caught with their tails swollen and presenting a ringed appearance. A few had tails sore and broken. This is the 'ring tail' disease which also occurred in animals kept in the laboratory for breeding. This is probably due to the fact that at the beginning of winter, on account of the sudden drop in temperature, a few of the less resistant animals develop the disease. Otherwise, diseased animals are rarely noticed in a wild population of gerbilles.

Intra-specific struggle is very common. This is particularly marked in young gerbilles when they migrate from the parent burrow and establish new homes. A large number of young trapped during October and November, had wounds indicating that they had been involved in fights. Victims of a fight are commonly found bitten through the back of the neck. Young gerbilles are often eaten by the larger ones. Generally an opening is made at the back of the neck, and as the flesh and ribs are eaten the skin is pulled back. Skinning out through the thoracic rather than the lumbar region appears to be the more usual method of eating. Cannibalism has also been observed in animals kept in the laboratory.

Of the predators, the snake *Zamenis mucosus*, the mongoose *Herpestes* and the owls are important. In the fields near the village the domestic cat takes a heavy toll. The snakes swallow the gerbilles completely. Carcasses of gerbilles with a large portion of the body eaten away might be the remnants of predation by either the mongoose or the owl. Village folk consider the flesh of the gerbilles excellent eating and spare no pains to get them out of their hideouts. Any study of the 'Home ranges' and other trapping experiments fails on account of this interference by man.

BEHAVIOUR IN CAPTIVITY

The gerbilles are rather shy and timid and remain in their burrows for most part of the day. A number of specimens captured at different seasons of the year have been kept in wire cages for breeding. They were fed on the same grains as grown in the fields from which they were caught and were provided with fine straw as bedding. The grains were regularly alternated with a liberal supply of green leaves. During the day they lie curled up in a corner of the cage and the slightest disturbance startles them, when they move about agitatedly in the cage. All attempts made so far to get them to breed in captivity have failed. Perhaps the sudden change from a

wild condition to the narrow confines of the cage, cuts short their activity besides taking them away from the warmth of the soil 4 to 5 ft. below the ground level. A number of pregnant females brought forth litters after a few days of their capture, but ate all the young within two or three days of their birth. This behaviour in captivity possibly indicates an extreme expression of the tendency towards cannibalism, characteristic of the species. Juvenile gerbilles are more easily managed and eat whatever is offered to them. They are more docile than the adults.

REPRODUCTION

No information is available concerning the reproduction and breeding seasons of the gerbilles except the observation of Phillips (1935) that in the Ceylonese gerbille 'The young are born at any time of the year but have generally been found during the north-east monsoon, October to April. The number of young is 4'.

Collection of material in all months of the year offered evidence of the fact that the young are born from September to the first week of March. The earliest litters are noticed in the burrows in the third week of September. Following this there is a continuous production of the young till the middle of February and a few stray births continue till the first week of March. From March to the end of August there were many gerbilles with inactive uteri. Histological examination of the ovary and uterus showed that non-parous animals were in a greater percentage than parous adults. The number of juvenile gerbilles weighing between 22 grams and 70 grams is on the increase from October onwards. Pregnancies were generally confined to the heavier weight groups (above 95 grams) pointing to the conclusion that the gerbilles do not breed in the same season as of their birth.

SIZE OF THE LITTER

The number of mammae is often a rough guide to the average size of the litter. There are four pairs of mammae in *Tatera indica cuvieri*; the first pair is pectoral; the second pair, thoracic; the third pair, abdominal and the fourth pair, inguinal in position. Thirty gravid females of the gerbille examined by me showed that the number of embryos ranged from 5 to 8. Usually a lactating female showed evidence of all the mammae having been used. The distribution of the embryos and the placental scars was almost equal between the two horns of the uterus. Litter counts collected from the burrows correspond roughly with the embryo counts in gravid females.

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SYNOPSIS

The natural history of the South Indian gerbille *Tatera indica cuvieri* (Waterhouse), subfamily: Gerbillinae; family: Muridae, about which very little is known at present, has been described. The description pertains to the form occurring near a village about 3 miles from Bangalore, South India. The environment, vegetation and climate of the area are described. The gerbilles are nocturnal and live in burrows dug on the borders of cultivated fields. The burrows are long and winding passages with a number of emergency exits and a breeding or living chamber in the centre in which the litter is laid. The physical environment does not affect the survival of the gerbilles. Intra-specific struggle is in evidence at the time of migration of the young ones from the parent burrow to establish new homes. Cannibalism is of frequent occurrence. The snake, *Zamenis mucosus*, the mongoose, *Herpestes*, the owl and domestic cat are the probable predators. All attempts made so far to get them to breed in captivity have failed. Mothers have been observed eating their litter shortly after their birth in captivity. The young are born from the third week of September to the last week of February or the beginning of March. Gerbilles do not breed in the year of their birth. The litter size ranges from 5 to 8.

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